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TRANSMITTAL FORM

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Application Number	09/773,896
Filing Date	02/01/2001
First Named Inventor	David H. Thibado
Art Unit	2832
Examiner Name	Tuyen T. Nguyen
Total Number of Pages in This Submission: 17	Attorney Docket Number: PHA 28,583C

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
- [x] Fee Attached
- [ ] Amendment/Reply
- [ ] After Final
- [ ] Affidavits/declaration(s)
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- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
- [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
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- [ ] After Allowance communication to Technology Center (TC)
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Remarks

Enclosed in an appeal brief and the required fee.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	James D Leimbach, Reg. No. 34,374
Signature	James D. Leimbach
Date	May 3, 2004

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 330.00

Complete if Known	
Application Number	09/773,896
Filing Date	02/01/2001
First Named Inventor	David H. Thibado
Examiner Name	Tuyen T. Nguen
Art Unit	2832
Attorney Docket No.	PHA 23,583C

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☑ Credit card ☐ Money Order ☐ Other ☐ None

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Deposit Account Name

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below	Fee Paid
Total Claims		-20** =		X	=
Independent Claims		- 3** =		X	=
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

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SUBTOTAL (3) ($) 330.00

SUBMITTED BY				(Complete *(if applicable)*)	
Name (Print/Type)	James D. Leimbach	*Registration No. (Attorney/Agent)*	34,374	*Telephone*	585 381-9983
Signature				*Date*	May 3, 2004

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of David H. Thibado AIR-WOUND COIL FOR VACUUM PICK-UP, SURFACE MOUNTING, AND ADJUSTING Serial No. 09/773,896 Filed: February 01, 2001	Group Art Unit: 2832 Examiner: Tuyen T. Nguyen I hereby certify that this correspondence is being deposited today with the United States Postal Services as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patent Commissioner for Patents P.O. Box 1450 Alexandria VA. 22313-1450 Name: James D. Leimbach Registration No. 34,374 Date: May 3, 2004

Mail Stop Appeal Brief-Patent

Honorable Commissioner of Patents and Trademarks

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Sir:

APPEAL BRIEF. 37 C.F.R. 1.192

05/06/2004 SSESHE1 00000122 09773896 330.00 OP
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TABLE OF CONTENTS

Introduction

This Application is before the Honorable Board of Patent Appeals and Interferences, from a final decision of the Examiner as indicated in the Advisory Action dated February 25, 2004.

Real party in interest

The real party of interest is the Assignee who is U. S. Philips Corporation, a corporation existing under the laws of the State of Delaware (hereinafter Appellant).

Related appeals and interferences

There are no related appeals or interferences to the present application that are known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of the Claims

Claims 17, 18 and 20-29 as filed are drawn to an air wound coil that provides for post placement tuning and that provides an air wound coil that can effectively be used with high speed, modern-day pick and place machines.

Status of the Amendments After Final

A response was filed subsequent to the final rejection to overcome the Examiner's rejection of claims 17, 18 and 20-29 under 35 U.S.C. §103(a). Claim 19 is objected to but is otherwise allowable. The Examiner in an advisory action indicated that the rejection based on §103 stands.

Summary Description of the Invention

The present invention relates to a method and apparatus for an air-wound coil that ca be placed on a circuit board by vacuum pick-up devices. The air-wound coil placed in accordance with the invention can be tuned after placement (see page 4, lines 25-34). The air-wound coil is formed from a wire bent into a plurality of sequential loops. A surface of material is connected to the coil over a plurality of the sequential loops allowing the coil to be picked up by a vacuum head of a pick-and-place machine (see page 4, lines 27-29). The surface material includes adjusting means to allow for adjusting a position of the loops of the coil for turning the coil, after the coil is attached to a circuit board (see: page 4, lines 29-32; page 5, lines 1-22; and page 6, line 11 to page 7, line 5).

Multiple terminals of the coil provide electrical connection to pads on the circuit board using an electrically conductive material to connect the pads to the respective terminals. The circuit board employed by the invention has a dielectric substrate with numerous electrically conductive pads connected to the substrate providing electrical interconnection between components and the substrate. The circuit board is a wired circuit board providing electrical connections between the pads and additional circuits on the circuit board (see page 5, line 32-page 5, line 5).

The problems to be solved by the invention, as well the advantages of the invention, are described in detail in the description. Briefly stated, the invention as defined by the appealed claims has the advantage of providing a coil for use as an inductive device with a surface that allows simplified placement of the coil by modern, vacuum base and pick and place machines. Additionally, the same surface that allows the simplified placement of the coil allows for tuning of the coil placement.

Issues on Appeal

The only issue presented is whether claims 17, 18 and 20-29 under 35 U.S.C. §103(a).

Grouping of the Claims

The claims do not stand and fall together.

Arguments

A. The rejection under 35 U.S.C. S 103

Claims 17, 18, and 20-29 stand rejected under the provisions of 35 U.S.C. §103(a) as being unpatentable over JP 62-242320 issued to Okanoe et al. (hereinafter referred to as Okanoe et al.) in view of DE 290694. The Examiner's position is that it would have been within the scope of one of ordinary skill in the art employ a surface as taught by DE 290694on the coils taught by Okanoe et al., the surface containing adjusting means to allow tuning of the coil after placement on a circuit board.

B. The references

Okanoe et al. (JP 62-242320) disclose a coil formed within a conductive foil of a printed circuit that is connected in series to a hollow-core coil that is used for adjustment (see Abstract). The range of fluctuations of inductances is determined by the width W of the hollow core-coil, the width W is the distance encompassed by all the loops within the hollow-core coil (see constitution). Thus, Okanoe et al. provide an inductance that is the result of a foil-based coil in series with a hollow-core coil.

In summary, Okanoe et al. disclose a method and apparatus for fabricating a relatively large inductance device on a circuit board and providing a small coil for adjusting the inductance value. Note that Okanoe et al. does not mention, indicate or otherwise refer to the problems that are associated in the placing inductive devices using vacuum based pick and placed machines to place hollow core-coils. Accordingly, Okanoe et al. does not address the problems associates with the placement of hollow-core coil devices using automated machines, especially, vacuum based pick and place machines.

DE 290694 discloses an electric spool component intended to be used for surface mount device assemblies (see Title and Field of the Invention on page 2, lines 1-7). The electric spool has a small plate mounted to the spool that allows easy handling of the electric spool without damaging it (see page 2, line32 through page 3, line 3). The small plate allows easy handling and placement of the electric coil by low-pressure vacuum controlled pipettes (see page 5, line 23 to page 6 line 4). The small plate configuration can be used with different components, for example spools with different diameters, and provides for standardization in use with pipettes (see page 6,lines 6-12). The plate is preferably attached to the coil using glue (see page 7, line 36 to page 8, line 4). The plate is preferably made out of plastic (see page 10, lines 30-33). Note that DE 290694 doe not mention or otherwise refer to, nor teach adjusting the electric coil assembly.

DE 290694 discloses an electric coil assembly with a small plate 4 attached (see page 10, line 30 to page 11, line 2). The small plate 4 is secured on the coil in using glue or other means. Portions of the glue are evident in Fig. 1 (b) as indicated by reference sign 5. The plate 4 is intended to allow a highly intricate machine to employ a suction pipette to place the electric coil assembly on a circuit board (see page 11, lines 19-26).

Fig. 2 of DE 290694 illustrates a further embodiment in the form of an electric, cylindrically wrapped spool 6 having a total spool length that is larger than the electric coil of the embodiment of Fig. 1. DE 290694 teaches that in spite of the increased length of spool 6 shown in Fig. 2 compared to the electric coil of Fig. 1, that a plate 4 having the identical dimensions can be used in either case, thus, providing standardized placement procedures that can be employed for differently sized electric components and different component types (see page 12, lines 15-29). DE 290694 teaches that different components can be used with an identical plate 4. The appellant respectfully points out that DE 290694 does not teach, or suggest, that adjustments can be made to the components attached to plate 4 once the coil assembly is attached to a circuit board. More importantly, there is no teaching within DE 290694, for the plate to have any function in providing adjustments to loops of the coil.

C. The differences between the invention and the references

With respect to Okanoe et al. (JP 62-242320) and DE 290694, neither Okanoe et al. nor DE 290694 disclose or claim a surface of material connected to the coils having adjusting means to allow for adjusting a position of the loops of the coil for turning the coil. Furthermore, neither Okanoe et al. nor DE 290694 disclose or claim, a surface of material connected to the coil having adjusting means that allow tuning of the coil after the coil is attached to the circuit board.

The Examiner points out that Okanoe et al. do not disclose adjusting means. The appellant respectfully points out that Okanoe et al. do in fact disclose adjusting means. The adjusting means are the inherent ability to adjust the inductance by arranging the loops of the coil to tune the coil. Okanoe et al. provide no teaching relevant to a surface of material that can assist in the automated placing of the coil on a circuit board. Therefore, the Appellant believes that the instant claimed invention of a circuit board having a coil comprising a plurality of sequential loops with a surface of material connected to the coils extending over a plurality sequential loops of the coil for pick-up with a vacuum head of a pick-and-place machine, and including adjusting means to allow for adjusting a position of the loops of the coil for turning the coil, after the coil is attached to the circuit board, is not disclosed or suggested in any manner whatsoever by Okanoe et al.

With respect to DE 290694, there is disclosed a coil assembly specifically tailored to be used with pipettes in modern, automated pick and place machines. The assembly disclosed by DE 290694 is directed to fastening a plate on to a coil in order to allow placement on a circuit board. DE 290694 teaches that the plate is preferably plastic so as not to interfere with the electrical characteristics of the coil. DE 290694 also teaches that the plate can be made of metal (see page 8, lines 6-13).

The appellant respectfully points out that the plate 4 taught by DE 290694 is not equivalent to the surface of material connected to the coils recited by the appealed claims. The plate 4 taught by DE 290694 does not have any function to allow the adjusting of the position of the loops of the coil for turning the coil, and moreover the plate 4 as taught by DE 290694 does not provide any function for turning the coil after the coil is attached to the circuit board. In fact,

any attempt towards adjusting the loops of the coil assembly taught by DE 290694 could result in breaking the coil assembly taught, therein.

Thus, while DE 290694 discloses a coil assembly with a plate that can be used with modern automated pick and place machines, DE 290694 does not mention, disclose, teach or suggest any surface that allows the adjusting of the loops within the coil for turning the coil. Nor does DE 290694 teach that the plate 4 as taught therein can be fabricated from a surface that allows for turning of the coil after the coil is attached to the circuit board.

The plate as taught by DE 290694 is designed to fit within predetermined areas with in a circuit board (see page 14, lines 6-25). The appellant respectfully points out that DE 290694 does not teach any actions being performed on loops of the coil after the plate that is attached to the circuit board. DE 290694 does not teach, suggest or mention to any adjustment capability for the loops of the coil assembly. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Okanoe et al. do not provide any teaching for a surface that allows modern pick and place machines to place a coil on a circuit board. Moreover, Okanoe et al. do not teach a surface on the loops of the coil that provides any usefulness in tuning the coil. DE 290694 does not teach, or suggest, that the plate taught, therein, has any potential usefulness in adjusting the loops of coil. The Appellant respectfully submits that there is no teaching within either Okanoe et al. or DE 290694 that would lead a person skilled in the art to use the plate taught by DE 290694 in an attempt to provide for the adjustment the loops of the coil taught by Okanoe et al., especially after the coil has been mounted on a circuit board.

Appealed claim 18 defines subject matter for the adjusting means including that at a portion of the surface can be removed from the wire coil without damaging the wire coil, so that a position of the loops of the coil can be changed to tune the coil. Neither DE 290694 nor Okanoe et al. provide any teaching or suggestion for a surface attached to the coils that can be used as adjustment means, much less that the adjusting means could be removed. DE 290694 does not disclose that any part of plate 4 can be removed once it is glued onto the coil.

The Appellant would like to, point out that the Final Office Action has indicated that Claim 19 would be allowable if written in independent form. Claim 19 defines subject matter for the surface not extending between all of the loops of the coil so that the loops of the coil can be arranged for tuning the coil.

Claim 20 defines subject matter for the adjusting means including the surface is sufficiently weak or flexible so that the loops between which the surface extends can be easily bent to adjust a position of the loops sufficient for tuning the coil without otherwise damaging the coil. The appellant would like to respectfully point out that the Final Office contains no assertion contain within Action that either Okanoe et al. or DE 290694 teach or suggest the subject matter defined by appealed claim 20. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for a surface attached to the coils that can be used as adjustment means. Moreover, neither Okanoe et al. nor DE 290694 teach or suggest that the surface can be sufficiently weak or flexible so that the loops between which the surface extends can be easily bent to adjust a position of the loops sufficient for tuning the coil.

Claim 21 defines subject matter for the adjusting means to include that the surface is degraded by exposure to a solvent that can be used to wash the circuit board after the coil is connected to the circuit board, whereby the loops can be bent to adjust a position of the loops for tuning the coil. There is no assertion contain within the Final Office Action that the cited references, Okanoe et al. or DE 290694, teach the material recited by appealed claim 21. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for a surface attached to the coils that can be used as adjustment means. Moreover, neither Okanoe et al. nor DE 290694 teach or suggest that the surface is degraded by exposure to a solvent that can be used to wash the circuit board after the coil is connected to the circuit board, whereby the loops can be bent to adjust a position of the loops for tuning the coil.

Claim 22 defines subject matter for the adjusting means including that the surface is degraded by exposing the surface to water and at least a portion of a material of the surface can be removed by washing in water without damaging the coils. There is no assertion contain within the Final Office Action that the cited references, Okanoe et al. or DE 290694, teach or suggest the material recited by appealed claim 22. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for a surface attached to the coils that can be used as adjustment means or that the surface is degraded by exposing the surface to water and at least a portion of a material of the surface can be removed by washing in water without damaging the coils.

Claim 23 defines subject matter for the adjusting means to include the surface being degraded by heating the circuit board after which the separation between the loops can be changed by bending the loops for tuning the coil. There is no assertion contain within the Final

Office Action that the cited references, Okanoe et al. or DE 290694, teach or suggest that the surface as recited by appealed claim 23. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for a surface that can be degraded by heating the circuit board after which the separation between the loops can be changed by bending the loops for tuning the coil.

Claim 24 defines subject matter for the adjusting means to include the material of the surface flows when exposed to soldering temperature of eutectic Pb/Sn alloy, so that after heating the circuit board to reflow the solder at least some of the loops become bendable for tuning the coil. There is no assertion contain within the Final Office Action that the cited references, Okanoe et al. or DE 290694, teach the material recited by appealed claim 24. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for a surface that includes a material that flows when exposed to soldering temperature of eutectic Pb/Sn alloy, so that after heating the circuit board to reflow the solder at least some of the loops become bendable for tuning the coil.

Claim 25 defines subject matter for the adjusting means to include a material of the surface that sublimates when exposed to soldering temperature of eutectic Pb/Sn alloy, so that after reflow soldering the circuit board at least some of the loops become bendable for tuning the coil. There is no assertion contain within the Final Office Action that the cited references, Okanoe et al. or DE 290694, teach or suggest the material defined by appealed claim 25. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for a surface that includes a material that sublimates when exposed to soldering temperature of eutectic Pb/Sn alloy, so that after heating the circuit board to reflow the solder at least some of the loops become bendable for tuning the coil.

Claim 26 defines subject matter for the adjusting means to include that the surface is sufficiently soft and arranged, so that it can be easily cut between loops of the coil using a tool without damaging the coil and then a position of the loops of the coil can be adjusted to tune the coil. There is no assertion contain within the Final Office Action that the cited references, Okanoe et al. or DE 290694, teach the material recited by appealed claim 26. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for a surface that includes a material that that it can be easily cut between loops of the coil using a tool without damaging the coil and then a position of the loops of the coil can be adjusted to tune the coil.

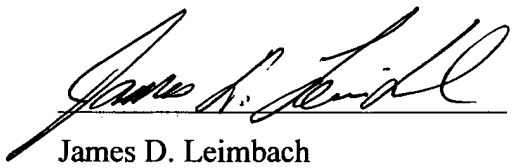
Claim 28 defines subject matter for the adjusting means to include the loops being spaced apart and of a material such that the position of the loops are adjustable. There is no assertion contain within the Final Office Action that the cited references, Okanoe et al. or DE 290694, teach the material recited by appealed claim 28. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for the loops being spaced apart and of a material such that the position of the loops are adjustable.

Claim 29 defines subject matter for many potential limitations for the adjusting means and there is no assertion contain within the Final Office Action that the cited references, Okanoe et al. or DE 290694, teach or suggest the numerous potential limitations for the adjusting means defined recited by appealed claim 29. Neither Okanoe et al. nor DE 290694 provide any teaching or suggestion for many potential limitations for the adjusting means defined by appealed claim 29.

D. Conclusion

In summary, the Examiner's rejections of the claims are believed to be in error for the reasons explained above. The rejections of each of claims 25-28 should be reversed.

Respectfully submitted,



James D. Leimbach
Attorney for Appellants
Registration No. 34,374

Telephone: 585-381-9983
Facsimile: 585-381-9983

APPENDIX 1. Claims on Appeal

17. A circuit board, comprising:

a dielectric substrate:

a plurality of electrically conductive pads connected to the substrate for electrical interconnection of components to the pads;

wiring extending between the pads;

a coil of wire bent into a plurality of sequential loops;

multiple terminals of the coil at respective pads;

an electrically conductive material connecting between the pads and respective terminals;

a surface of material connected to the coils extending over a plurality sequential loops of the coil for pick-up with a vacuum head of a pick-and-place machine, and including adjusting means to allow for adjusting a position of the loops of the coil for turning the coil, after the coil is attached to the circuit board.

18. The board of Claim 17 in which the adjusting means includes that at least a portion of the surface can be removed from the wire coil without damaging the wire coil, so that a position of the loops of the coil can be changed to tune the coil.

19. The board of Claim 17 in which the adjusting means includes that the surface does not extend between all of the loops of the coil so that a position of the loops, between which the surface does not extend, can be changed by bending the coil for tuning the coil.

20. The board of Claim 17 in which the adjusting means includes that the surface is sufficiently weak or flexible so that the loops between which the surface extends can be easily bent to adjust a position of the loops sufficient for tuning the coil without otherwise damaging the coil.

21. The board of Claim 17 in which the adjusting means includes that the surface is degraded by exposure to a solvent that can be used to wash the circuit board after the coil is connected to the circuit board, whereby the loops can be bent to adjust a position of the loops for tuning the coil.

22. The board of Claim 21 in which the adjusting means includes that the surface is degraded by exposing the surface to water and at least a portion of a material of the surface can be removed by washing in water without damaging the coils.

23. The board of Claim 17 in which the adjusting means includes that the surface is degraded by heating the circuit board after which the separation between the loops can be changed by bending the loops for tuning the coil.

24. The board of Claim 23 in which the adjusting means includes that the material of the surface flows when exposed to soldering temperature of eutectic Pb/Sn alloy, so that after heating the circuit board to reflow the solder at least some of the loops become bendable for tuning the coil.

25. The board of Claim 23 in which the adjusting means includes that the material of the surface sublimates when exposed to soldering temperature of eutectic Pb/Sn alloy, so that after reflow soldering the circuit board at least some of the loops become bendable for tuning the coil.

26. The board of Claim 17 in which the adjusting means includes that the surface is sufficiently soft and arranged, so that it can be easily cut between loops of the coil using a tool without damaging the coil and then a position of the loops of the coil can be adjusted to tune the coil.

27. The board of Claim 17 in which the coils are spaced between 2 and 10 times the diameter of the wire.

28. The board of Claim 17 wherein the adjusting means includes that the loops are spaced apart and are of a material such that the position of the loops are adjustable.

29. The board of Claim 17 in which:

the adjusting means is selected from one or more of:

at least a portion of the surface can be removed from the wire coil without damaging the wire coil so that a spacing between the loops of the coil can be changed to tune the coil;

the surface does not extend onto some of the loops of the coil so that a position of the loops can be changed by bending the coil for tuning the coil;

the surface is sufficiently weak or flexible so that the loops on which the surface extends can be easily bent to adjust a position of the loops sufficient for tuning the coil without otherwise damaging the coil;

the surface is degraded by exposure to a solvent that can be used to wash the circuit board after the coil is connected to the circuit board whereby the loops can be bent for adjusting a position of the loops for tuning the coil;

the surface is degraded by exposing the surface to water and at least a portion of a material of the surface can be removed by washing in water without damaging the coils;

the surface is degraded by heating the circuit board after which the separation between the loops can be changed by bending the loops for tuning the coil;

the material of the surface flows when exposed to

soldering temperature of eutectic Pb/Sn alloy so that after heating the circuit board to reflow the solder at least some of the coils become mechanically separable for tuning the coil;

the material of the surface sublimates when exposed to soldering temperature of eutectic Pb/Sn alloy so that after reflow soldering the circuit board at least some of the coils become mechanically separable for tuning the coil; and

the surface is sufficiently soft and arranged so that it can be easily cut between loops of the coil using a tool without damaging the coil and then a position of the loops of the coil can be adjusted to tune the coil;

and wherein;

the terminals are strait sections of wire extending tangentially to the loops of wire at each end of the coil of wire;

the coil is an air coil without any core;

the wire is nearly pure copper;

the wire is between .05 mm and 1 mm in diameter;

the coils are spaced between 1.1 and 20 times the diameter of the wire; and

the diameter of the loops is between 10 and 100 times the diameter of the wire.